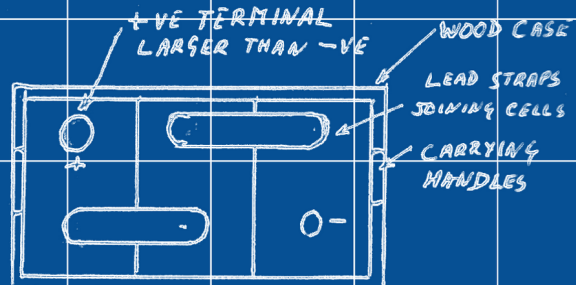
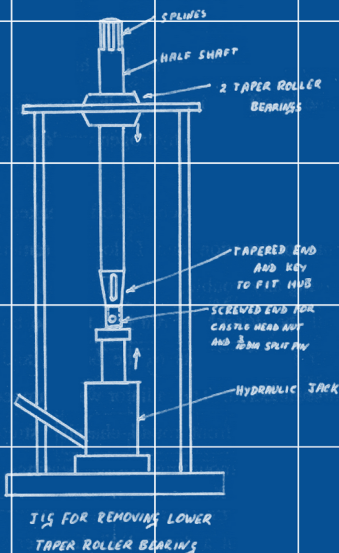


A Personal Account of Cumberland Motor Services Workington Garage 1935 - 1944

By Ron Smith



6 VOLT BATTERY
3 - 2 VOLT CELLS

A Personal Account of Cumberland Motor Services
Workington Garage 1935 - 1944

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First published 2010
Second Edition 2023

Introduction

In the pages that follow I have attempted to tell what life was like in Cumberland Motor Services Workington depot between 1935 and 1944.

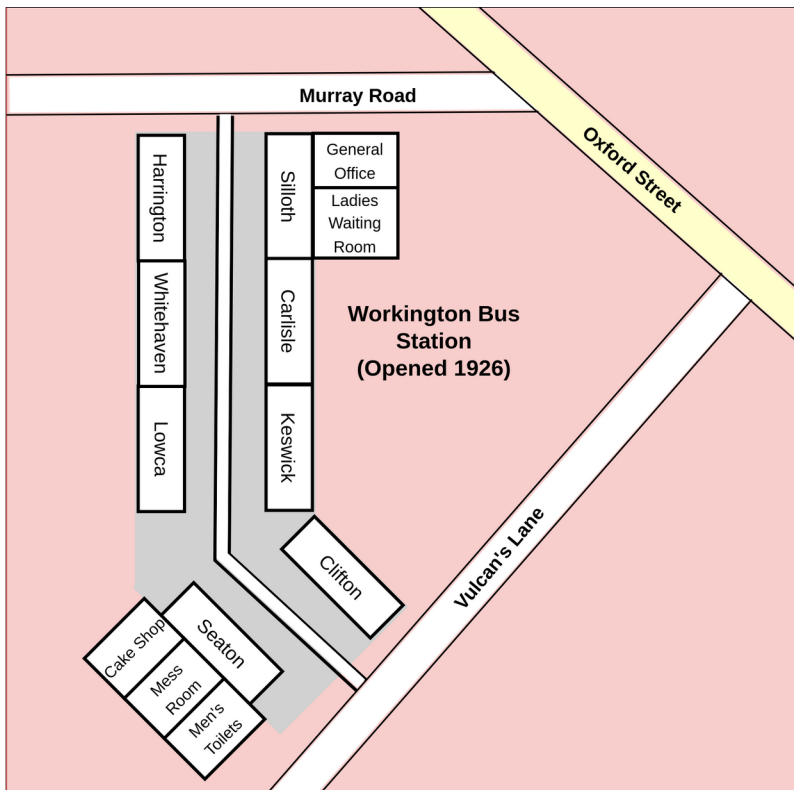


Figure 1: The bus station in my time showing the layout of the stands and surrounding buildings

The story starts as I left school aged fifteen seeking work, continues through my apprenticeship and develops as I become a qualified fitter specialising in bus electrics.

Along the way I begin sweeping the floors, follow an all round grounding in bus mechanics and develop a special talent for things electrical. Starting on six shillings a week as a boy I reach a man's wages of three guineas.

After my 47 hours in the workshops each week, I make plenty of use of the sports and social facilities including tennis, badminton and outings. I also find time to study at "The Tech" reaching Higher National, then going onto qualify to teach in 1944.

During the war "mend and make do" was the catch phrase and led to some real inventiveness to keep the buses on the road. Some of our devices are outlined in the text and sketches. Much hard work went into keeping the buses rolling but there were always amusing incidents and a garage full of characters to make it all worthwhile.

As it is sixty five years since I last worked on a bus please enjoy the work for what it is, recollections in the order they came back to me.

The sketches and text are from memory...written in 2010.

Readers Notes

Every readers interest will be different. Please enjoy the whole story but if you are searching out specific information then try pages ...

Vintage bus enthusiast.....	7 - 37
Social historian.....	5,10,28,39,44,46
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Another shortcut to places, people or technical items is to go to the index at the end.

Job Seeking

I left school in the summer of 1935 aged 15 years. My father had died the previous March leaving my mother a widow with myself and a brother 7 years younger. During this period I tried to get a job and did manage to find a temporary one with the GPO as a telegraph boy. This was quite interesting, I remember going to public houses and allotments with telegrams which simply said "Liberated 2-30 West". It referred to pigeon racing and the men would rush to their lofts, blow whistles and shake tins with stones in them to attract the birds. I also remember going to the Workington Star premises to take telegrams to a little office upstairs in the printing department. On the way I would pass the type setters and in an evening see the big printing machine in action. This job only lasted three weeks while the three regular telegraph boys had their holidays, there were no vacancies. I also went for an interview at Workington Town Hall to be a meter money collector. The collectors read the dials, opened the meter with a key took out a box full of pennies, counted them put them in little blue bags and gave a receipt. At this time gas was 8.837d a therm or 3s/2d per 1000 cubic feet. My father died saying to my mother "Our Ronnie got that job" but I didn't, I was disqualified because I wasn't 16 years of age.

Interview

I did however get an interview with Harry Meageen, Chief Engineer of Cumberland Motor Services at Whitehaven and was offered a job as an apprentice fitter at Workington. The pay was 6/- the first year with yearly increments 8/-, 10/-, £1, £1 10s, with £2/10s and full money of £3-3s at 23 years of age. With off-takes in the first year I had 4/2d to take home and my mother had 5/- week for me on widow's pension and now had to buy two pairs of boiler suits and working boots. Extra to this, once a month I had to pay union fees to the Transport and General Workers Union with a party political levy every quarter even though I hadn't got a vote. One day a conductor came to me and asked me for money for the Mutual Aid Society. When I refused he said

“Your father had plenty out of it”. I know my father had been ill with TB for some time before he died and had been in a sanatorium at Threlkeld but I did not know anything about his finances and with only 4/2d to take home I was not very pleased. During the war a bonus was paid.

When I was earning more money, instead of taking my overalls home to be washed I joined a scheme run by a firm in Yorkshire. They provided two pairs of overalls one pair was away being washed while you were wearing the other pair and changed each week. A stitch was put in the cuff and after a certain number of washings recorded by the stitches a new pair was provided.

Early Days and Sweeping Up

During my first year I was given all the lowly tasks such as taking out and returning time sheets, sweeping the workshop floor, cleaning the toilets and locking up.

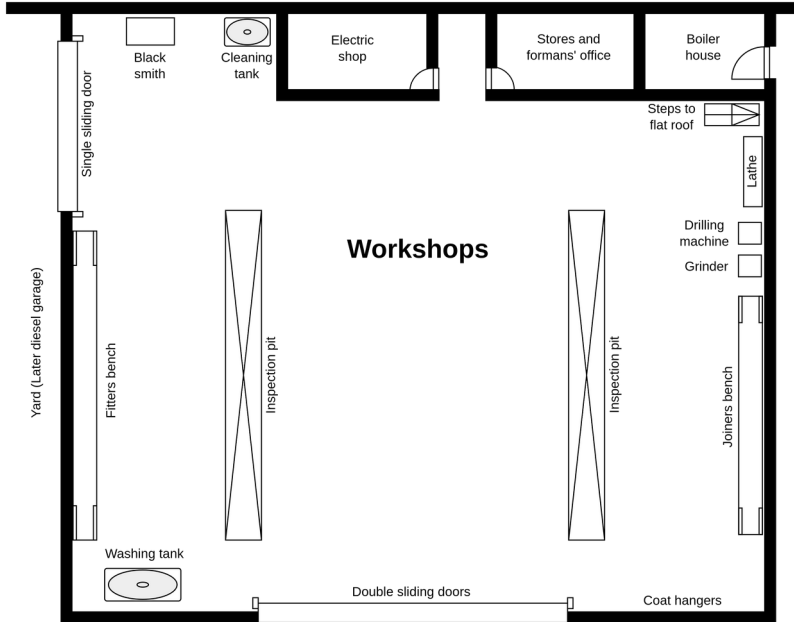


Figure 2: Workshop layout

We also received visits from Public Service Vehicle Inspectors and I would be allocated to him. The bus to be inspected would be driven over a pit. I would take out all the pit boards sweep the floor of the pit and clean up any oil. I would then jack up the front wheels of the bus, get out of the pit, put a bar in the top of the wheel and lift the wheel up and down. He would use a torch and look for play between the king pin and bushes. Next I would sit in the cab and work the steering wheel backwards and forwards for him to check for play in

the track rod and steering joints. This would be followed by looking for broken leaves in the road springs, checking for wear on the brake linings, wear on the transmission and oil leaks. The steering arms had to be polished to look for cracks.

Body work was inspected in particular where it was fastened to the chassis, rotten woodwork noted, also the condition of seats and cushions. Next it was taken out on a road test. A certain length of time was allowed for repairs to be carried out and then it was re-examined.

With the Engine Fitter

In the first year help was given to anyone who needed it but in the second year you were attached either to a general fitter or an engine fitter. A general fitter could do anything from relining brakes or clutches to changing road springs.

We did no work on tyres or inner tubes. Dunlop and Goodyear provided fitters who looked after pressures, punctures, retreading and new tyres. We only helped with the tracking.

During the nine years I was there I do not remember doing any work on a gearbox or differential. Maybe this was because they were checked regularly. We had two men who did nothing else but grease and check oil level in these components.

We had a blacksmith whose main work was repairing road springs. There was a joiner who looked after the body work, an upholster, an electrician, a welder, three garage men and cleaners.

Night Shift

The cleaners were always on nights. The garage men worked shifts. Their job was to top up with water, oil and petrol and have the buses warmed and ready for the driver in the morning and go out to breakdowns. For some reason unknown to me the petrol buses had all the electric starters taken off. To start the Leyland Titans and Tigers in the morning the garage man first took off the bonnet side, turned a spring loaded knurled wheel on the side of the Solex carburettor fully anti-clockwise and made it stay in that position by jamming a wooden wedge between the wheel and the carburettor body. He then put a matchstick under the throttle adjusting screw to race the engine a little, then retarded the ignition advance and the retard lever on the steering column. Sometimes two men would get hold of the starting handle, one with his right hand and the other with his left and swing the six cylinder engine to start it. If he was on his own he would use the Whipple starter.

Whipple Starters

The Whipple starter was a two cylinder petrol engine mounted on a frame and two wheels. It was positioned in front of the bus and an arm extended and pinned to the top of the starting handle. A handle was pulled to lift it off its wheels, then its engine started. Another handle was pushed to engage the dogs on the starting handle with those on the bus crankshaft, a foot pedal was pushed down to increase engine speed and engage a centrifugal clutch to turn the bus engine. With petrol engines it was not unknown for them to kick backwards especially if the ignition had been advanced too far. To prevent damage to the Whipple some copper pins on the arm would shear. If the driver stopped the engine during the shift he had to swing it himself.

In the cab of every bus was a clip board which was kept in a box on the inside of the cab roof. The driver had to enter his mileage and any petrol or oil that was put in the vehicle. He also had to fill in a card giving the fleet number of the

buses he had driven that day and that they were OK or if the bus had any faults, for example if the brakes needed adjusting. The garage man entered all the faults in a book at the end of the day and took it round to the workshop where it was placed on a book stand for the foreman and fitters to see the next morning.

Clogs

The cleaners would empty ash trays, sweep out the inside of the bus, clean windows, and use brushes with extensions to clean the outside of the bus with water. Most wore clogs, they said they kept their feet warm!

Dirty Jobs

Being attached to an engine fitter was a very dirty job for the first few days. A record was kept of the total mileage, fuel and oil consumption of each bus and when it had done 10,000 miles it was brought in for engine overhaul. Six cylinder petrol engines did about 6 miles to the gallon and six cylinder diesels about 11. Total mileage may seem low but with short journeys and lots of starting and stopping the hours of running may have been more appropriate but I am sure this would have been taken into account.

On a Monday morning the bus was brought into the workshop and driven over the pit to have an engine overhaul. Pit boards were taken out, water drained from the radiator and the cylinder block. Oil was drained from the engine sump and the sump removed. The oil pipes feeding the main bearings and the oil pump were removed. The big ends were checked to see that they were numbered correctly and then the caps taken off. Above ground the mud guard was taken off, the carburettor, inlet and exhaust manifolds, rocker arms, cylinder head and radiator were all removed.

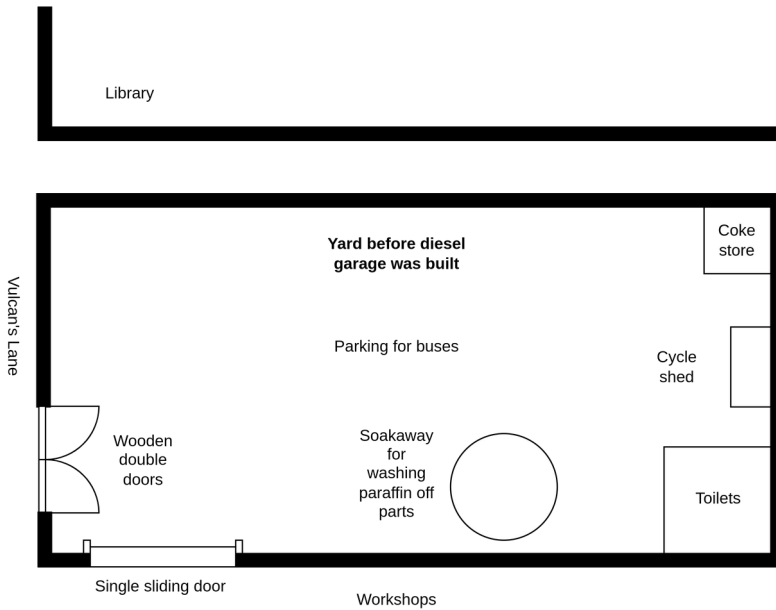


Figure 3: Yard layout

The electrician took off the dynamo and magneto. The cylinder block was then unfastened and removed with the help of a crane, with pistons still in place and lowered on to a bench. The crankshaft, timing case and water pump were usually left in place unless there was a fault on any of these components.

Next came the big clean. As much dirt as possible was scraped off with a knife then the parts were placed in a big paraffin tank. This tank was on wheels and had a pump at one end. The bottom quarter of the tank was filled with paraffin, above this was a false bottom full of holes.

Parts were placed on this false bottom and a tin filled with paraffin using the pump. Using a paint brush all the parts were cleaned. The parts were then taken

out into the yard put over a soak away and sprayed with water, finally dried with rags.

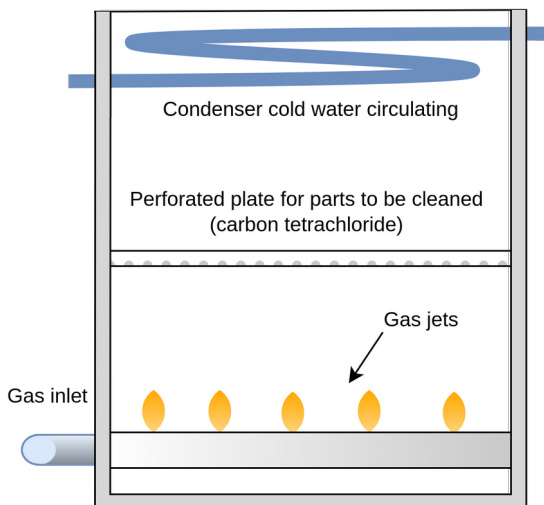


Figure 4: Degreasing tank

Much later, when we lost the yard due to the diesel garage being built, we had a degreasing tank. This consisted of a tank with a gas heater in the bottom below the liquid carbon tetrachloride. Above this a tray full of holes and at the top of the tank a double ring of copper pipes through which cold water circulated to condense the fumes given off which cleaned the parts put on the tray.

Circlips were removed from the ends of the gudgeon pin and the pin knocked out to separate the piston from the connecting rod compression rings and scraper rings removed and everything thoroughly cleaned. The piston rings were removed and replaced by new ones. Each one in turn was placed in the cylinder block and the gap between the two ends tested with a feeler gauge. The gap was a thousandth of an inch for every inch diameter of the piston. This was

to allow for expansion when the engine was hot. When the piston was assembled the gaps were staggered round the piston so as not to lose compression. The scraper rings were pegged to line up slots in the ring with slots in the piston. Big ends were tested on the crankshaft and if found to be too slack the shims were taken out between the rod and the cap. The electric shop serviced the dynamo and magneto and in the case of diesels the starter motor also. The cylinder head for both petrol and diesels was eventually taken back to the fitter and assembled on the engine. The radiator was filled with water and the sump filled with Castrol XL oil. The engine was started and the vehicle taken on test. The cylinder heads were tightened and any other adjustments made on return, the whole operation taking a week.

Diesels were treated in a similar way but the injectors and fuel pump were sent to Whitehaven to be serviced. On the older diesels it was necessary to remove injectors, fuel pump and fuel pump platform to remove the dynamo. On later buses the chassis was cut away so that the dynamo would slide out and leave the pump in place.

Smoke Clouds

Sometimes we had difficulty starting the diesels after having them in pieces. External batteries were connected from a trolley, the air filter removed and a blow lamp flame played over the air intake to heat the air as it went into the engine. If this failed then a Leyland Lion number 43 was hooked up and the bus taken out on tow. I remember on one occasion towing for about half a mile before it started and this was in the very centre of Workington. Huge clouds of blue smoke from the exhaust filled the street making people run to close doors and windows. We took off the tow rope and disappeared very quickly relieved afterwards that we heard no more about the incident.

General Fitter

Working with a general fitter could be very interesting as the work was so varied. The garage man would collect all the driver's reports together from the previous day, enter them in a book, take the book into the workshop and place it on a book stand outside the stores. The foreman would examine all the faults recorded and then distribute the work to the fitters.

Sometimes this would mean bringing a bus into the workshop that was in service. A substitute bus would be driven onto the stand in the bus station and some very annoyed passengers and crew would have to get out and board the new vehicle. The driver in particular was not very pleased because of all the form filling for the two buses. There was also trouble if the driver got his hands dirty off the steering wheel or grease on his white coat.

Brakes

Brakes needing adjustment was a common fault but sometimes they had to be relined. All the wheels had to be jacked up using a hydraulic jack but we never depended on these for any length of time as they could leak and gradually lower, so a screw jack was always put in place after the initial lifting with the hydraulic jack. There were single wheels on the front and double wheels on the rear with ten nuts to take off to remove. The brake drum and hub on the rear were held in place by a 3/16 split pin and a large castle headed nut. After taking these items off, a puller was used to remove the hub and brake drum from the keyed taper shaft. Inside were two sets of brake shoes, one set for the foot brake and one set for the hand brake. A chisel shaped punch was used to remove the strong return springs and then the shoes would slide off.

One by one the shoes were put in the vice and the rivet heads chipped off and punched out. New linings were held in place with 'G' clamps, drilled and countersunk and then riveted on using 1/4" diameter countersunk headed

rivets. When all the wheels had been completed the brakes were adjusted and the vehicle taken out on test. The brakes were servo assisted. On the side of the chassis was a cylinder with a piston inside. The piston was connected to the brake pedal and the cylinder by a pipe to the inlet manifold of the engine. When the brake pedal was slightly depressed it opened a valve on the servo which allowed air from the front of the servo piston to be sucked into the engine helping the brakes to be applied as the driver pushed the pedal further down. Petrol engines had rods for adjustment but diesels had pipes and fluid brakes.

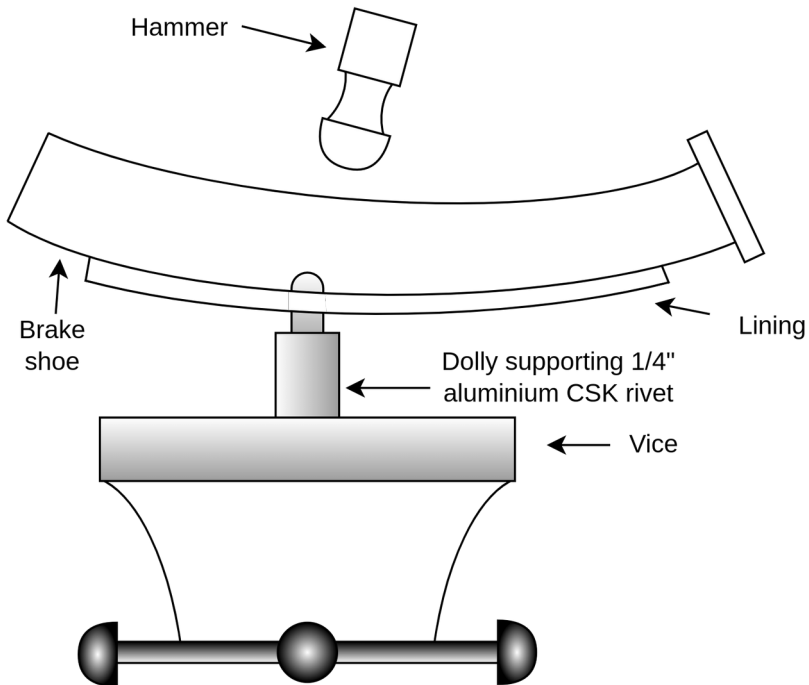


Figure 5: Riveting a new lining on the brake shoe

The diesels also had servos but due to the large open end on the induction manifold there was very little suction. To create suction, a butterfly valve was fitted under the air filter which closed when the brake pedal was applied. Another system was to have an exhauster driven by the engine. The exhauster sucked air out of a tank which ran parallel to the silencer. When the brake pedal was depressed it operated a valve on a servo allowing air in front of the servo piston to be sucked into the tank, helping to apply the brakes. Diesel engined buses only had one large pair of brake shoes on the rear and on Lions the foot brake operated on the front wheels and a transmission brake behind the gear box. The linings on the transmission brake being alternate pieces of cast iron and Ferodo. The cast iron linings were held on the with copper rivets. The hand brake worked the rear wheels by metal ribbons.

Clutches

In spite of all the hours of running and the countless number of gear changes made I was always surprised how long a clutch lasted before it needed relining. To reline the clutch the bus was first run over a pit and the Spicer coupling drive removed behind the gearbox. The clutch lever was removed and then all the nuts round the bell housing. Inside the bus the bell housing cover was removed, then an eye was screwed into a hole in the roof and a block and tackle hung on this eye. A sling was put round the gearbox and attached to the block and tackle and the gearbox removed. This revealed a casing containing a ring of compression springs and the clutch lining. This was removed by taking out all the screws round the circumference. The old bearing was taken out of the flywheel and a new one put in place. The new lining was put on a dummy bar and then the bar put into the bearing in the flywheel. The housing containing the springs, fingers and clutch plate fastened in place and the dummy bar removed. Next the gear box was put in place and the long shaft on the gear box would slide through the splines on the clutch plate and enter the hole in the bearing on the flywheel, the dummy bar having lined up everything.

Adjustments were made to the fingers. The main adjustment, a large wing nut on the clutch pedal, was adjusted to give one inch of free movement on the pedal before it started to disengage. There was a metal disc which engaged with another disc on which was a Ferodo lining. This prevented the gear box from spinning and made gear changing easier.

Crash boxes

The Lions had a crash gear box and a very short gate change gear lever on the right hand side of the driver. When changing up, the clutch was depressed released while in neutral, pressed in again and the next gear selected. When changing down the same procedure was used except the engine was raced when in neutral to try and equalise the engine to the gearbox speed. At first I had difficulty with this but was told that by the time I had done an eight hour shift on the Workington to Harrington route I would be an expert.

Wartime

Before the war many of the fitters were in the Royal Army Ordnance Corps Reserves. If I remember correctly they were being paid £3 per quarter and did no training as their job was sufficient, but when war was declared they were mobilised very quickly. This meant problems for the company.

Although I had not finished my apprenticeship in 1939, I was able to step in and do all the electrical work required on the buses because of my background and because they were very short of staff.

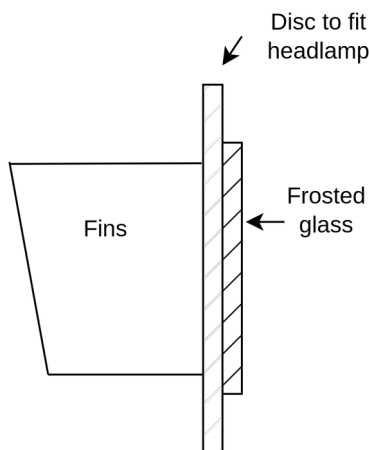


Figure 6: Headlamp mask

First came the blackout. All the interior lights on the bus were painted black except for a small disc left in the centre. This was the same on the side-lights. Headlights were painted out leaving a slit about 1/2 an inch wide right across the centre. A hood was also fitted. Later, headlamp masks were introduced. These were a metal disc with a rectangular box containing fins and frosted glass on the inside. Drivers often put a steel ruler between the fins and either broke or

knocked the glass out of the clips. Of course this allowed rain to get in and damaged the reflectors. Due to restrictions it was a long time before we could get reflectors re-plated.

Conductor's Lamps

Due to the restricted lighting, conductors had difficulty taking fares so they were provided with little lamps which were hung round their necks. These consisted of a rechargeable battery with a hood, bulb and switch. These were collected every morning. The hood was separated from the battery, a screw plug was taken out of the front of the battery and then placed on charge for eight hours. After charging, if required, they were topped up with distilled water and assembled.

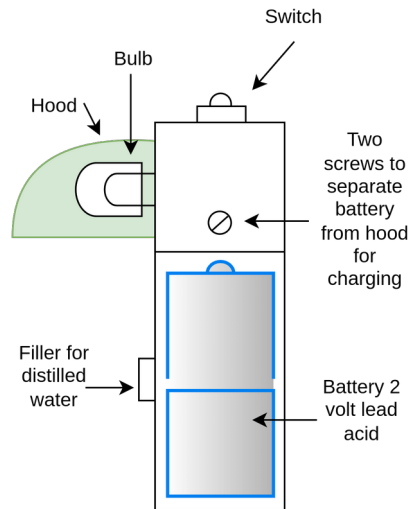


Figure 7: Wartime bus conductor's lamp

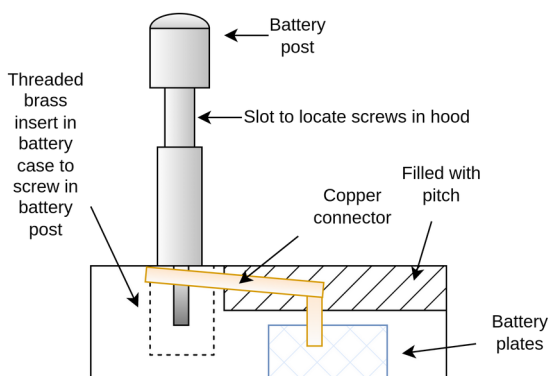


Figure 8: Battery for conductor's lamp

Make Do and Mend

Being lead acid batteries, after a time contacts would corrode and so new ones had to be obtained. These had to be made. It was government practice to 'make do and mend'. This was taken a bit too far at times when I found the interior electric light bulbs were disappearing. Eventually I found out that one of the conductors was taking them to make cigarette lighters!

Running on Gas

During the war we had several buses that were converted to run on gas. They had a pipe from the engine to a trailer which was towed behind the bus on which was a solid fuel generator. The driver had to get off now and again to act as stoker. I never worked on these appliances, we had a fitter specially trained to look after them.

Shocking!

I remember the garage man coming into the electric shop one day and telling me that he had been checking the engine oil level on a diesel vehicle, but when he was taking the bonnet off he was getting sparks and asked me to have a look. Sure enough, he was right, and at first the fault took some finding. The

headlamp which was mounted on a piece of tubing had the other end fastened to the dumb iron at the front of the chassis. The body of the headlamp itself was live but there was an insulating bush to stop electricity flowing into the chassis. Inside the headlamp casing was a bulb holder with a twin filament - one for bright headlamp and one for dipped. One of these connections was earthed to the headlamp. Going underneath the bus I examined the main leads from the cab to the batteries. One of these leads had the insulation rubbed off and was touching the chassis. The result was that when the bonnet side was taken off and touching the headlamp, it was making contact with the now live chassis!

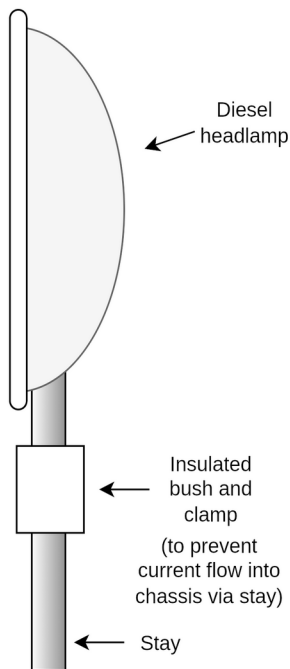


Figure 9: Diesel bus headlamp

The Electric Shop

Conductor's lamps might have taken up quite a lot of time but a huge range of tasks from daily maintenance to breakdowns came my way whilst working in the electrical shop.

Magnetos

Magnetos were taken to pieces, the armature and condenser (capacitor) checked, slip ring cleaned and carbon brush replaced. Magnets were re-magnetised and the contact breaker fitted with new points. The rocker arm was re-bushed and the points adjusted. Before fitting to the engine the magneto was put on the test bench and driven by an electric motor at various speeds. The distributor was connected to adjustable spark gaps to test performance. The latest magneto on which I worked was the Bosche JR6. This was a dual purpose magneto. If the magneto failed the driver could turn a switch on the distributor to select a second set of contact breaker points, take out the main lead from the magneto to the distributor and screw it into another socket which put the system on a coil ignition circuit.

When the magneto was fitted to the engine, the engine was first rotated and the inlet valve on the number one cylinder was observed to open and close. Then we had to go inside the bus, take the cover off over the flywheel and gearbox and look for the numbers 1 and 6 as the engine was slowly turned by hand.

It was stopped when these marks were about one inch before the vertical position. This was known as advancing the piston one inch before top dead centre. The magneto was rotated so that the distributor arm was opposite the number one segment on the distributor. The advance and retard lever on the steering column was set at fully retarded and the contact breaker made just to open. The magneto was placed on its platform on the engine and a fibre coupling placed between the toothed wheel on the engine and the toothed wheel on the

magneto. The coupling had 20 teeth on one side and 19 teeth on the other and by rotating it was possible to line up the teeth on engine and magneto without altering the gap in the contact breaker points. The coupling was known as a vernier coupling. A strap round the magneto was then tightened to keep the magneto in place. Number 1 sparking plug lead from the distributor went to the sparking plug in number 1 cylinder, the next one following a clockwise direction to number 5 cylinder and so on following the firing order of the engine which was 1,5,3,6,2,4. On Lions the firing order was 1,3,4,2.

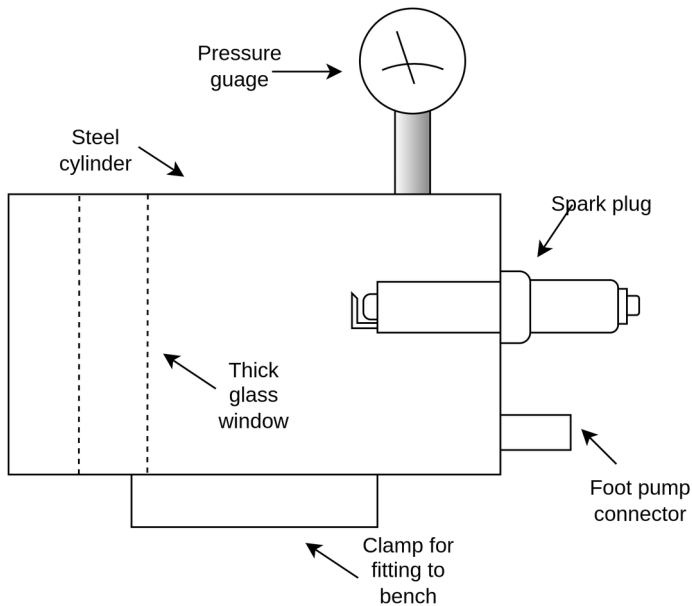


Figure 10: Spark plug tester

Sparkling plugs were cleaned and adjusted in the electric shop. First the end was brushed with a wire brush, taken to pieces and the inside cleaned. After assembly the points were adjusted and set with a feeler gauge, the plug was then tested on a sparking plug tester. This consisted of a metal cylinder drilled and

threaded at one end to take the sparking plug and a thick glass at the other end. On one side was a pressure gauge and on the other side a valve similar to the one on an inner tube to attach a foot pump. An old Ford Model T trembler coil was used to produce the spark, the coil being connected to a battery.

The sparking plug to be tested was screwed into the cylinder, power connected and switched on, then air was pumped into the cylinder with a foot pump. If the plug was still sparking after reaching a certain pressure it was passed OK. Great care had always to be taken when opening the electric shop door as one never knew when the trembler coil might be fixed to the door handle!

Starting

Bus batteries were also charged in the electric shop. There was a mains electric motor connected to a dynamo to provide DC which was connected to a control panel containing knife switches, variable resistances, volt meters and ammeters. This was used every day to charge batteries on a battery trolley. Diesel engines were often difficult to start on a cold morning and the older ones did not have internal heaters. Sometimes we would sit on the mudguard holding a blowlamp over the air intake to heat the air going into the engine, but of course a garage man was on his own. To save running down the internal batteries on the bus two connectors were fixed in the cab to which wires were connected from a battery trolley and the internal batteries of the bus bypassed.

Starter Motors

Starter motors gave very little trouble. The internal contacts, brushes, pinions and commutators were the main things to examine. When the driver pressed the starter button the top pair of a double set of contacts closed causing a solenoid effect on the armature which was sucked forward engaging the starter pinion with teeth on the flywheel as the armature moved forward. A large disc on the end of the armature lifted a trigger allowing the bottom set of contacts to close

and apply full power to turn the engine. Some times when these contacts were ready for replacement they would weld together and even though the starter button was released in the cab the motor would still keep turning. To overcome this a heavy duty switch was made and placed under the driver's seat so that he could isolate power going to the motor.

Dynamos

Dynamos needed very little maintenance. Usually cleaning, oiling and replacement of brushes was all that was necessary but on occasions a flat spot would develop on the commutator. When this happened, the armature had to be taken out and skimmed in the lathe with a very sharp tool and plenty of top rake. Next came a process known as under cutting. In between each of the copper segments was a piece of mica and this had to be cut out so that it was just below the level of the copper. To do this a hack saw blade was used followed by rubbing with fine emery paper.

Valves

As well as doing the electrical work, the electric shop was also responsible for maintenance of the cylinder heads at an engine overhaul. After cleaning, the valves were taken out by compressing the valve springs and taking out the split cotters. The valves and ports were all cleaned, taking off the thick carbon. Valves were then put in a grinding machine where the seating was ground to the correct angle and made smooth. A new valve was next put into valve guide in turn and tested for wear. Badly worn ones were punched out and new ones put in place.

Valve seatings on the cylinder head were examined and if thought to be too wide were replaced by an insert. The old seating was cut out using a special cutter bolted to the cylinder head and lined up with the valve guide. Then a tube of cast iron was on the lathe and turned down on the outside to be a press

fit in the groove made in the cylinder head. After boring, facing and putting a bevel on the end it was parted off. Using a nut and bolt in the cylinder head, the special cutter was put in place again. The top of the insert was made flat with the cylinder head, the cutter changed and a 45 degree seating made. The next job was to grind in the valves. A small amount of valve grinding paste (carborundum) was put on the valve seating. The top of the valve was gripped with a sucker on the end of a piece of dowel rod and rotated backwards and forwards. This was continued until a nice grey line was seen on the valve and the valve seat, then it was tested.

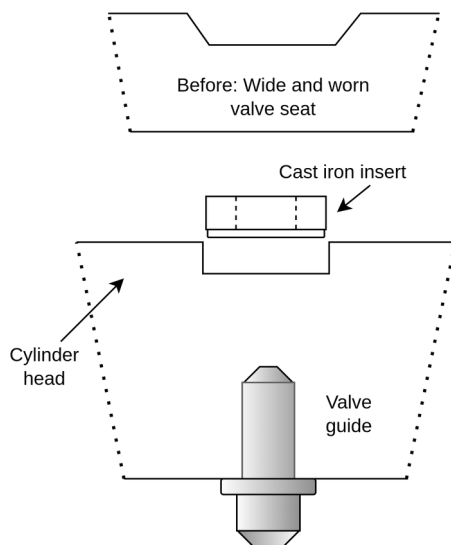


Figure 11: Valve maintenance

The valve tester was a cylinder blanked off at one end with a rubber ring on the other end to stop leakage when it was placed over the valve to be tested. A pressure gauge was fitted to one side of the cylinder and a piece of rubber tubing and a rubber bulb at the other.

After placing over the valve to be tested hand pressure was put on top of the cylinder and air pressure pumped into the cylinder, if the gauge remained steady then it passed and work started on the next valve. When all the valves had been ground in, the cylinder head was washed with paraffin to remove all the valve grinding paste and assembled. Oil was smeared on the valve stem and put in place. The bottom spring cup was placed over the guide. Then a small and a larger spring were placed over the bottom cup, one coiled left hand and the other right, (this was to stop twist on the valve during operation). The top cup was then placed over the springs and the springs were compressed with a valve spring compressor and the split where the cotters were inserted.

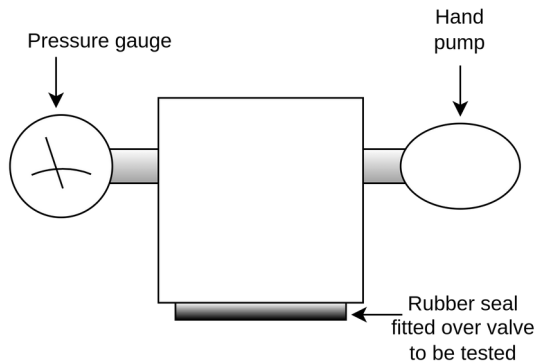


Figure 12: Valve tester

Cylinder heads on diesels were similar but they had screw inserts. The inlet valve had a flat on the side of the stem and a key and clip stopped the valve from rotating by being fitted to a slot in the valve guide. This was necessary because the valve had a deflector on one side close to the seating. New inlet inserts came with splines on the inside which were used for screwing in place but had to be removed once this was done to allow the valve to operate. Lions had two

cylinder heads and when assembled on the engine there was very little space between the two heads, yet a piece of hose and clips had to be put in to carry water from one head to the other. Instead of cotters valves Lions had a slot in the top of the valve and small rectangular pieces of metal.

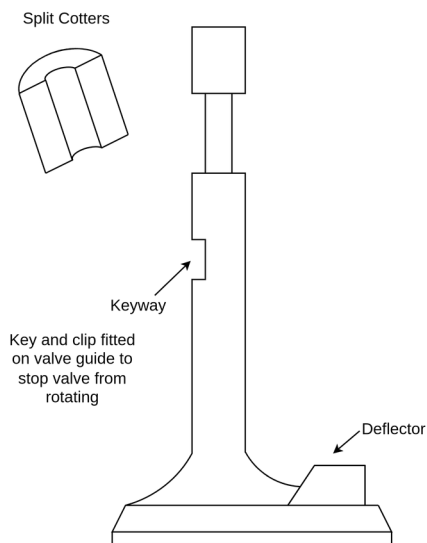


Figure 13: Inlet valve on diesel

Hot Engines and Night Work

We normally worked from 7:45am to 4:45pm (9 hours) with half an hour for dinner (8.5 hours worked) for five days of the week, but with a further 4.5 hours on Saturday mornings bringing the weekly total to 47 hours worked. We got paid for 48 hours, with time and a quarter for the first two hours of overtime and time and a half for the remainder. Sundays, Christmas day and Good Friday were paid at double time. At one period instead of working Saturday mornings I went back with the fitter on a Friday evening from 7pm until 1am. This was to adjust the valve tappets on the engines. The idea was to do this when the buses came in off service and the engines were still hot. First the bonnet side was taken

off. An old sack placed over the mudguard for medical reasons on which to sit and the valve cover taken off. The engine was turned by hand and we looked for the inlet valve opening and closing on one of the cylinders. A .006" feeler gauge was then placed between the top of the valve and the tappet screw and adjustments made if necessary to get the correct clearance. This was repeated on the exhaust valve but the clearance here was .008 inch. The other five cylinders were treated in the same manner.

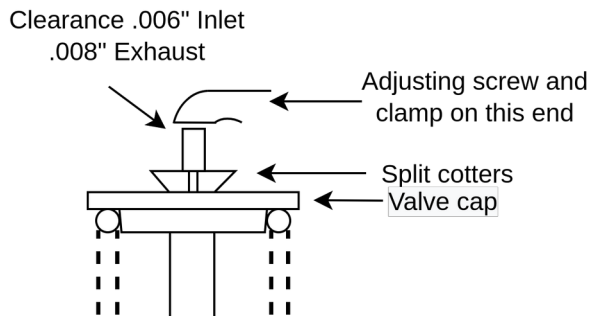


Figure 14: Inlet valve clearance adjustment

Rockers and Cotters

Usually things went well but we did meet problems. Sometimes we found worn cotters. The rocker arm was resting on top of the valve spring and no adjustments could be made so no new cotters had to be put in. First the rocker arms had to be removed. There were two sets, one for the first three cylinders and another set for the rear three. To prevent the valve from falling into the cylinder when the old cotters were taken out, a tube with screws in the side was placed over the top of the valve and the screws made tight on the side of the valve. A home-made valve spring compressor was located over the valve spring.

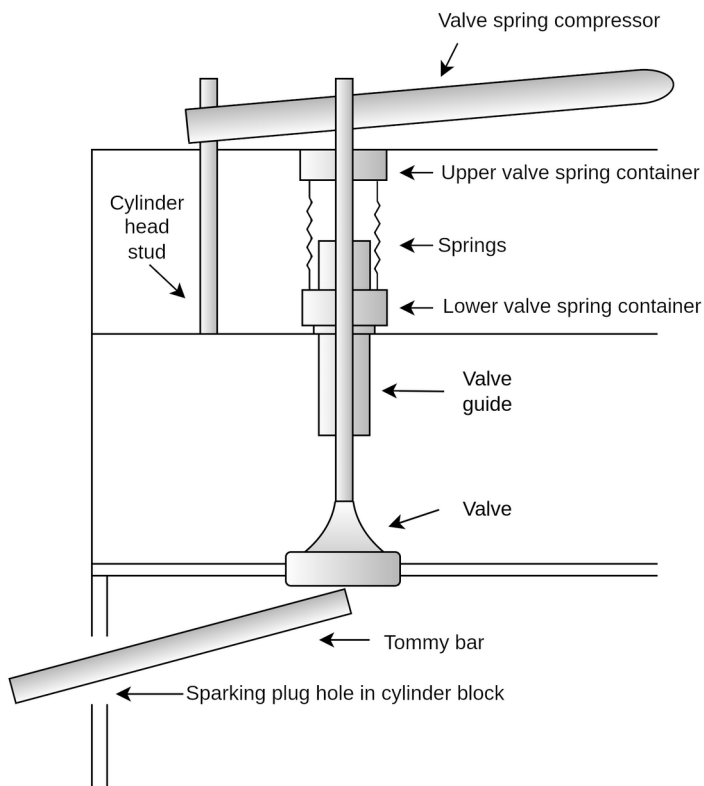


Figure 15: Method for changing cotteners

The sparking plug was next taken out of the side of the engine. A tommy bar placed through the plug hole and located under the head of the valve stopped the valve from being pushed down when the spring was compressed. The cotter could then be taken out and the new ones put in place. Rocker arms were then put back in and tappets adjusted.

Acid Test

A weekly job for the electric shop was to check the level of acid in the batteries and if the level was below the plates to top up with distilled water. The batteries had three two volt cells in a wooden box with handles on top.

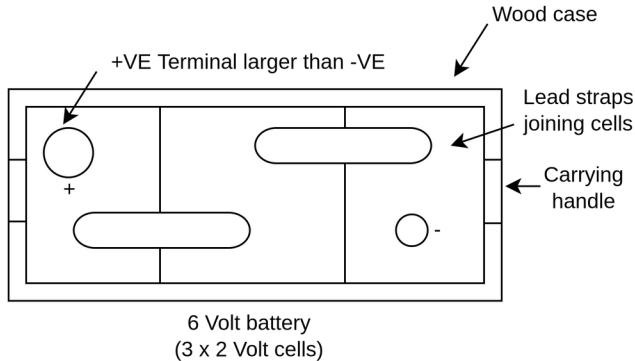


Figure 16: 6 volt battery

If they gave trouble we would test the specific gravity with a hygrometer which should give a reading of 1.26. Then we would test each cell in turn with a special voltmeter which put the cell under high load. If there was a faulty cell it would be replaced.

A cutter was used similar to the one used on radiators for removing the old solder. The offending cell taken out, a new one put in place and the gap between the cell post and the strap connecting the two cells filled with lead. Care had to be taken when removing the battery positive lead with a spanner not to touch the metal battery box frame with the spanner as it would make a short circuit to earth and cause sparks. This was especially dangerous if the bus had just come off service, when due to charging by the dynamo, hydrogen would be given off by the cells. I have seen cells explode!

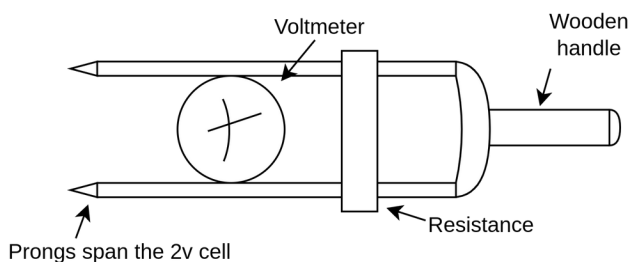


Figure 17: Battery tester

Radiator Problems

Radiators on the petrol vehicles often leaked and had to be repaired but those on the diesels were of a different construction and I do not remember them giving any trouble.

First all the water was run off, the bonnet taken off and the joints to the bottom and top tanks disconnected. The radiator was clamped by split bearings to the front round chassis stretcher which had rubber mountings for the bearings. The top and bottom tanks of the radiator were held to the frame by about a dozen 1/4" diameter studs all around the edge of the tank.

If there was a leak at the top then the top tank only was removed. The framework consisted of a brass casting at the top and bottom with copper tubes between the two castings. Each tube was full of cooling fins and the copper tubes soldered at each end into the castings.¹ A metal honey comb grill covered the front tubes.

¹ Various punches were made from valve stems and the spindles of oil pumps. Screwdrivers and scrapers were made from old files with wooden handles turned on the lathe. Copper tubes were flattened and tinned and used to solder the tubes in the radiators. A paraffin blow lamp was used for this job and the jet often got blocked. To clear it we would pull a single strand from a wire brush, open up a split pin and bend one end round the wire (Figure 19)

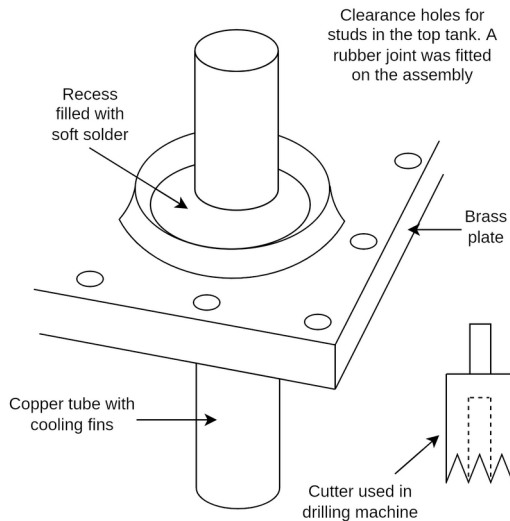


Figure 18: Radiator maintenance

Where the copper tube came through the casting was a brass cup and this cup was filled with soft solder to stop water leaking down the outside of the tube. Due to vibration this solder would crack and cause leaks. We had a special drill which fitted over the copper tube and drilled out all the old solder in the cup and then new solder melted in. A new rubber joint was fitted and assembled. Blanks were put over the inlet and outlet and the radiator filled with water to test for leaks. An inner tube valve was fitted to the top blank and a foot pump used to put it under pressure. Diesel engines had rubber fastenings instead of soldered joints.

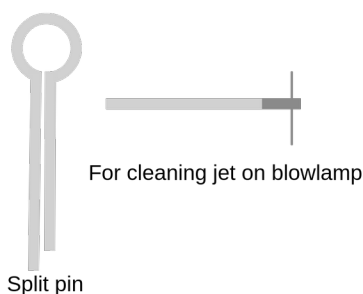


Figure 19: Tool for cleaning blowlamp

Half Shaft Problems - Live Axles

I remember being called out to a breakdown at Flimby between Workington and Maryport. The driver had lost traction and could not pull away from the bus stop. When we got there and made an examination we found one of the half shafts had broken² and if we had tried to tow the bus, the wheels would have come off! These were known as live axles, later buses had a different system. A half shaft in this case was not quite true, as the bus was a low bridge double decker, with the upstairs gangway sunk into a well which projected into the lower deck on the off side. The differential was on the near side of the lower gangway making this shaft shorter than the other.

The bus was jacked up, the wheels taken off and the broken shaft removed. We then had to do the same at the other side and put a bar in to knock the broken piece of shaft out of the differential. A passing bus was stopped and the old shaft and hub sent to the workshops in Workington.

² We built a special jig (Figure 20) for removing the lower bearing from a half shaft. The bearings were so close together that if a hammer and punch had been used they could have been damaged.

In the workshops they removed the two taper roller bearings and fitted them to a new shaft. Grinding paste was used to grind the new shaft to the taper in the old hub and the key checked. The new parts were brought out and fitted.

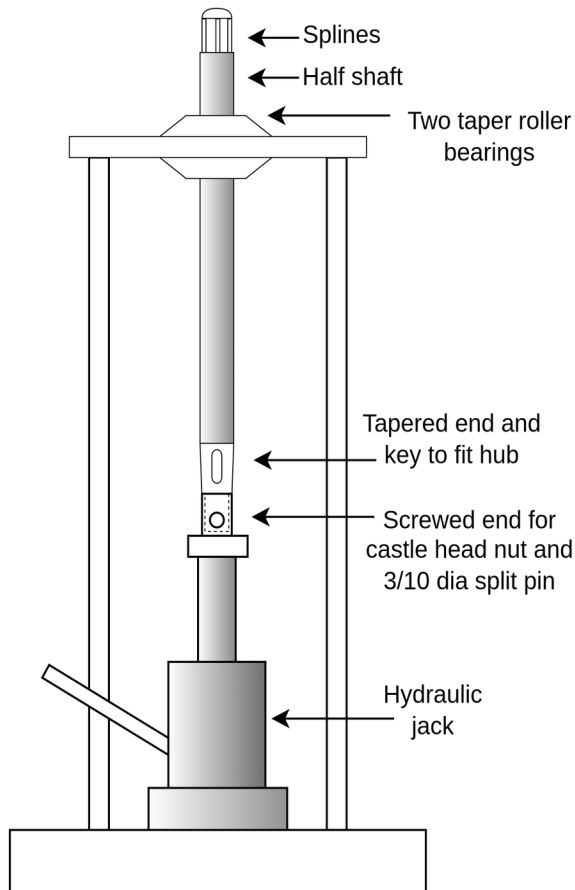


Figure 20: Jig for removing lower taper roller bearings

Wipers: the Faster You Drive the Slower They Go!

Windscreen wipers were cleaned, brushes and commutator checked and new grease put in the gear box and a new wiper blade fitted. There was an eccentric pin on which the crown wheel rotated. It had a screwdriver slot in one end which allowed it to be turned to adjust the meshing of the crown wheel and worm on the end of the armature this was then locked by a grub screw in the casing. Sometimes these pins broke, and it being war time with no replacements, I had to make new ones on the lathe.

We had a Ford lorry which had a suction windscreen wiper. This consisted of a tube sealed at each end, two pistons and link motion, valves in the centre and a rubber tube going to the inlet manifold on the engine. The engine had to be running to make it work. When the engine was running slowly the wiper worked very quickly but going uphill with the accelerator pressed down and the engine using a lot of air the windscreen wiper hardly moved.

Bell Shocks

There was an electric bell in the cab and bell pushes in the bus to signal to the driver when to start and stop. I would often notice after I had cleaned and adjusted the bell contacts pieces of rolled up paper and old bus tickets between the bell and the casing. Evidently the driver found it too loud

Lions had a mechanical bell. Screw eyes were fastened to the inside of the roof about a metre apart with a leather cord threaded through to a hammer on the bell in the cab.

I remember a conductor coming to me one day and saying he was getting a shock from one of the metal bell pushes. I cured this by reversing wires.

Anyone Heard of Blennerhasset?

The garage men only went out to break downs when we were not available. I remember a message coming in to say a bus had broken down at Blennerhasset. No one had heard of the place and we were treating it as a joke until someone got a map out and found it was a hamlet some 10 miles from Workington. Many years latter my wife and I were driving along a country road leading into Blennerhasset when we were challenged by a bull. There were a few anxious moments!

Social and Athletics

We had a social and athletics club into which we paid a small amount of money each week. There was a mess room in the bus station where we could play snooker or darts, listen to the radio or just sit, read or talk. We also played badminton. The room we used was an old munitions factory from the first world war which had a concrete floor and very high ceiling (no one ever hit the ceiling with a shuttle). There was still an overhead crane and rails in the roof. We had two courts divided by a curtain from the local opera house. A huge slow combustion stove fired by coke was at the side between the two courts and provided the only heating.

During the summer we could get tickets from the office to play bowls, tennis or putting on the park run by the local council. We were only allowed one ticket a week for each activity. My sport was tennis and so that I could play most evenings I would get other members of the staff who did not use their tickets to give them to me. We also had visits to Blackpool and Morecambe to see the illuminations and a visit to Glasgow to the Empire Exhibition, all paid for by the social and athletics club.

Jobs for the Talented

My father was a talented musician. He played the cornet and the piano in the local and military bands and also conducted. He played the trumpet in the orchestra in cinemas during the silent film days. He came from a musical family, his brother William Smith had conducted military bands in Canada and on his return to this country conducted Workington Town Band. William's son Harry was a cinema organist and played for the opening of the new Ritz Cinema in Workington under the stage name of Harry Crofts taken from his mother's maiden name of Thorneycroft.

I remember my mother telling me that my father once had the chance of playing in the Black Dyke Mills Band and would have been given a job in the factory but she would not leave Workington. I am pleased that she wouldn't because I thoroughly enjoyed living close to the Lake District.

This procedure seems to have gone on in other businesses because our firm was interested in cricket and people brought in to play cricket were given jobs. One man I worked with, Rex Wilson, was born in Lancashire and was a county standard spinner. Rex came to Workington to play cricket for the CMS (Cumberland Motor Services). His day job was as a greaser!

Hand Grenades

Rex joined the RAF and called in to visit us once when he was on leave and told the following story. A sergeant had been teaching them how to throw hand grenades (not live ones) and standing some considerable distance back invited them to try and hit him with them. Rex said "I made him run" He did not know of Rex's cricket background!

Hobbies for Life: Crystal to Valves

As far as I remember we always had a radio at home. My Uncle made crystal sets and then valve sets. The valves, tuning coils, aerial coils and reaction coils were all mounted on the front panel of the set. Wave bands were not changed at the touch of a switch. Three coils had to be taken out and another three put in. A modification was to put the valves inside the cabinet with spy holes to see if the filaments were alight. Headphones were first used and then came the horn type of loudspeaker. We had long aerials and lots of copper rods in the garden to provide a good earth. Power came from a 108 volt battery for the high tension, a 2 volt rechargeable accumulator for the low tension and a 9 volt grid bias battery. Later we had a battery eliminator. This replaced the 108 volt battery by taking power off the mains when electricity was installed in the house. We could

also recharge our 2 volt accumulators from the mains and later still we got an all mains set.

While still at school I got interested in radio, getting the bug from my Uncle, and made short wave sets. Many years later, when I was 75 years old, I took the amateur radio exams and now have my own transmitter.

Strange But True

Stop Police!

As the company grew it took over small operators. Sometimes they were bought out and given jobs, sometimes they carried on as normal but worked for the company and not for themselves. Joe Ditchburn of Flimby was one such operator who was bought out and given job as a greaser. I remember him telling a story of travelling along a road with a full bus and people standing when he saw a policeman in the distance. He assumed that word had got around that he often overloaded and the policeman was going to stop him. He stopped in advance and all the standing passengers got out of the emergency door at the back of the vehicle.

They Are All in There Somewhere!

Billy Gilmore of Seaton was another one man operator working for the company. He kept his bus at home and one of his main jobs was to take miners to and from work. He had a Bedford which was serviced at Workington and he was given a spare bus while his was away. It was number 67 and painted yellow. We called it the Yellow Peril. This was because of the position of the gear lever, it was on the right hand side and boxed in a small compartment. Those not used to it found changing gear difficult!

Feeling Kind of Strange!

Another operator taken over by the company was Noel Hamilton. He also had a taxi firm just opposite the workshops in Chapel Street. His coach number 90, a single decker Leyland, spent the war years fitted out as an ambulance along with two company Bedfords but were never used.

I drove taxis for Noel in my spare time at funerals and weddings and I remember driving at one funeral in particular one Saturday afternoon. We went

to a house in a row down by the river in Low Harrington and transported the mourners to the Church and burial ground at the top of the hill in High Harrington, it was a bitterly cold day. When we got back to the house we were invited in and given a drink. I got into the taxi and started to drive back to Workington but when I reached Salterbeck cemetery I felt dreadful. I stopped the taxi and sat there for half an hour or more before I felt well enough to move. Apparently I had been given some form of alcohol. This was the first time and only time in my life that I have had any.

Improve Your Grammar!

One of the fitters, Stanley Birds, had been transferred to Workington from Whitehaven workshops. Stanley was a local preacher and when things were not going well and strong language was being used Stanley would say “I do not like your adjectives.”

Student Travel

When I first started work in 1935 I found out that the foreman at Whitehaven was running evening classes in motor engineering in one of the local schools so I enrolled. I could travel free of charge on the bus to Whitehaven using my bus pass. When I first joined the company my pass was only valid within a 15 mile radius of my depot (Workington) then half fare had to be paid. This was later changed to free on all routes. Wives had three free passes a year and this applied to my mother being a widow.

Stop the Bus! I've Lost My Parcel

Another little story which comes to mind concerns my mother when she was travelling by bus to see a relative living in Seaton. The bus was a Leyland Tiger single decker and she was sitting on the side seat facing the door. As the bus rounded a corner at the bottom of Calva Brow she caught hold of my brother, a small boy sitting at her side, but at the same time released the parcel she was

carrying which bounced across the floor and out of the open door. The conductor stopped the bus and ran down the hill to retrieve it for her.

Buses Yes... Car No!

As a mechanic I had driven buses all through the war. I was issued with an ordinary provisional license but there was no testing taking place because of the war. Afterwards, during the post war years of rationing with no petrol and short of cash through buying a house, I did not renew my driving licence when it expired.

This was a big mistake because I found out had I kept my provisional going I would have been given a full license automatically based on experience. I could therefore have escaped the test! Now, I had to have an experienced driver sitting beside me. These were people I had taught to drive! To make matters worse I failed first time on questions about the Highway Code!

Keep the Nuisance Quiet?

Office staff, garage men, inspectors, and foremen were designated as being on the staff and received more money than the rest. How much more I never knew as they received their wages in brown envelopes where as ours had all details on the front. They were not allowed to be in the union. One union representative, a conductor, was given an office job which was probably one way the management had to stop him being a nuisance to them.

See Through Windscreens

One of the cleaners who was partially blind had the task of cleaning the windscreens. To do this he had to climb into the cab of the bus. All went well until he got out of the cab only to find someone had put his bucket of water under the cab step.

Curb Stones

We often had a visit from a council representative. I knew him because he was also church secretary of the Congregational Church that I attended. His complaint was about curb stones getting broken and pushed out of place due to vehicles been driven over them. Of course we knew nothing about it or so we said. The church was on the other side of the road to the workshops so he had a double interest

A Riveting Tale

We only had half an hour for lunch break so those of us who did not live too far away went home on bicycles. One day when we went to the cycle shed we found all the bicycles chained together and the two ends of the chain riveted together. Deliberately done by someone to delay us. We managed to saw through the rivet and were not delayed too long. We did not have to clock in or out and the foreman had an hour so we were OK!

Well Fed

The foreman used to frequent a local hostelry and he would get me to go from time to time to service the landlord's car. In conversation with the landlord I asked him if he remembered my grandfather Charlie Smith. It took him by surprise and he said that he was very pleased I had told him. My grandfather lived on his own and visited this public house and did little jobs for them. They in turn made sure he had one good meal every day.

Half Cut

In wartime getting a haircut was a problem so one of the fitters had a sideline in haircuts for the workshop staff. One afternoon he was half way through a cut, hidden away in the boiler room, when some one shouts the boss was coming. Both men quickly disappeared back to work but the half haircut had to stay until the end of the shift, much to everyone's amusement.

Fairground Fun

One day the landlord came to me and said that he had a friend who wanted to go to Morecambe and would I drive him there, stay the weekend and drive him back again. This I agreed to do and got a big surprise on our arrival to find that I was to sleep in a fairground type of caravan. I got even a bigger surprise before I went to bed when his relations came in with big bags of money and put them under the bed where I was about to sleep. They had been emptying their slot machines on the promenade and had to store the money until the banks opened on Monday morning.

It Really is Time I Read It

Talking of having to read it ... at the end of my first course at night school (based at Whitehaven Grammar School) was an exam in motor engineering, which I passed and was presented with a book at the prize giving evening. It is a beautifully bound book called "The Personal History Of David Copperfield" by Charles Dickens, which I have never read. Now had it been a book on motor engineering!

Education

Following on from the course in motor engineering:-

National Certificate

The following year I started on a National Certificate course in Mechanical Engineering at Workington Technical College, this was part time. The subjects were Maths, Engineering Drawing and Engineering Science over a three year period. Each year an exam had to be passed before being allowed to go on to the next year. I wanted to go on and take the Higher National course but for some reason the college was not allowed to set the exams.



Figure 21: Workington Technical College

While I was doing the National Certificate course from time to time I would help out the Dunlop Tyre fitter (Bob) with a part time job he had with the Workington Star newspaper. He drove their Morris Minor van every evening taking bundles of newspapers to shops in the Flimby and Grasslot area. One delivery I particularly remember was when I had to throw the newspapers over a

high wall. I could not see anything but I could hear them land on the other side. Everything must have been in order because I never heard anything to the contrary.

Teaching

Shortly after finishing the National Certificate course I met Hilda who later became my wife. She was a secondary school teacher and knew about woodwork and metalwork being taught in schools and suggested I made enquiries on how to qualify. This I did and found out about the City and Guilds Handicraft Teachers' Examination and that it could be done part-time but it would take me about four years. The first year was English, Maths and Science. I had no problems with the Maths and Science but Hilda had to help me with the English. Having got the first year over the second year consisted of a practical test in metalwork, engineering drawing and metalwork technology. This was followed by another year of the same subjects at a more advanced level. Next came a subject called "The Principles and Practice of Teaching". With Hilda's help and a correspondence course I was ready to take the exam, except that this was only possible after having six months teaching experience in a recognized day school and without pay. I found out that the Technical College was short of staff and managed to get a job there but the Manpower Board intervened. I was summoned to appear before them and was told that it was up to them to give me permission to leave my present employment and direct me to a new job and this could be in any part of the country. The irony of this was that I knew the chap who was making the demands. He often played tennis on the next court to me. However, I knew another man who was higher up the ladder than him. I went to see him and stated my case. The result was that I was allowed to take up the temporary teaching post, got paid and eventually qualified.

My first teaching post was at the Mid-Essex Technical College in Chelmsford where I stayed one year. I probably would have stayed longer but I got married and due to war time bombing houses were very difficult to obtain. Hilda had relations in Chesterfield and they managed to get us the house I am still living in today. This was quite the reverse of normal procedures, we got the house first and the job later.

Staff at Workington 1935-44

- Tommy Waugh - inspector
- Billy Hamil - inspector
- Eric Thomas - general office later became a teacher
- Jackson Lewthwaite - general office
- Len Southward - garage man, served apprenticeship at Lowca
- Lanty Hamilton - garage man
- Mick Mulholand - garage man, had a dance band with his daughter and friends
- Bill Fields - fitter became foreman, had worked for London Transport
- Mr Hume - foreman, died shortly after I started
- Jack Lamonby - fitter, left and went to a pumping station
- Tom McNeil - fitter, later foreman and then depot manager, played county tennis and gave me my first tennis racquet.
- Jack Stevenson - apprentice later fitter, lived at The Sun Inn in Flimby
- William Crawl - apprentice later fitter, lived at the Brown Cow on Whitehaven Road
- Jack Moore - apprentice later fitter, became a Public Service Vehicle Examiner
- Noel Dunn - fitter, also did the welding. His parents had a garage in Bridge Street
- Bobby Fearon - apprentice and then fitter
- Ron Smith - apprentice, then fitter, then electrician, then teacher
- Bob Turnbull - fitter
- Jack Cape - fitter, his wife had a shop in Maryport
- Tommy Smith - apprentice then fitter played football for Kells
- Clarence Birchall and Alan Whiteside - preceded me in the electric shop
- Jimmy Skelton - joiner

Cumberland Motor Services 1935 - 1944

- Rex Wilson - greaser, also played cricket
- Joe Ditchburn - greaser, his business taken over by CMS
- Jack Whalley - greaser, lorry driver, collected union fees, ARP instructor
- Stanley Birds - fitter and local preacher

Apologies to anyone whose name I have forgotten and missed out during this period.

Appendix - Original Diagrams

The original hand drawn diagrams for this book.

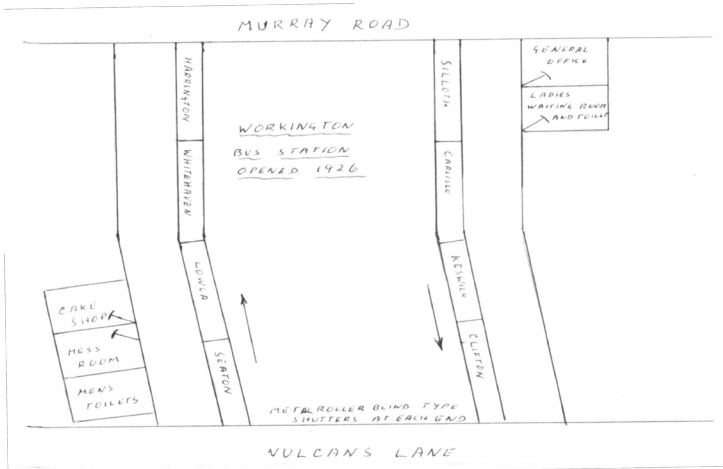


Figure 1: The bus station in my time showing the layout of the stands and surrounding buildings

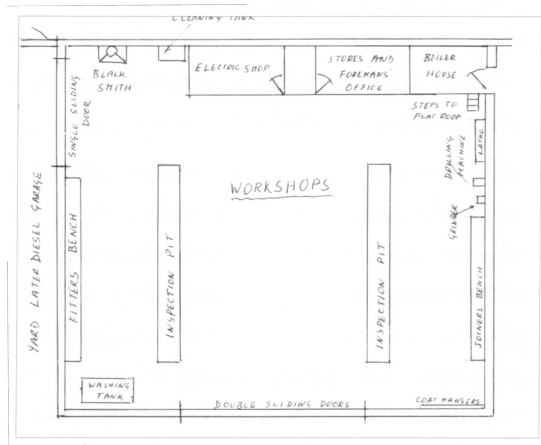


Figure 2: Workshop layout

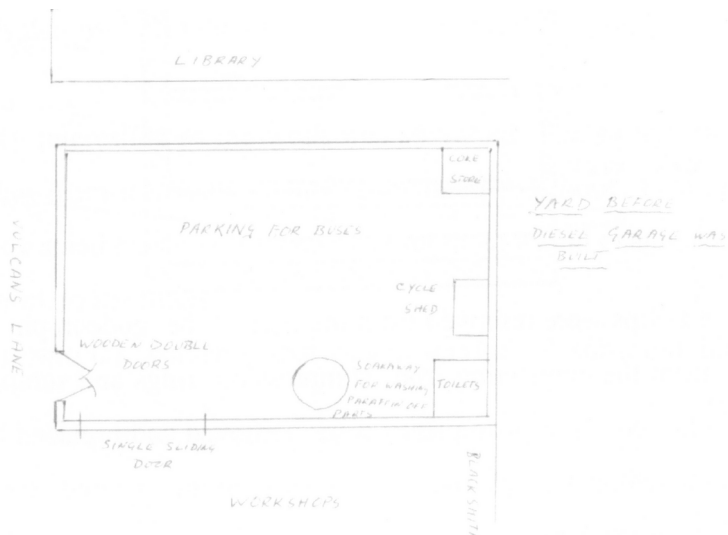


Figure 3: Yard layout

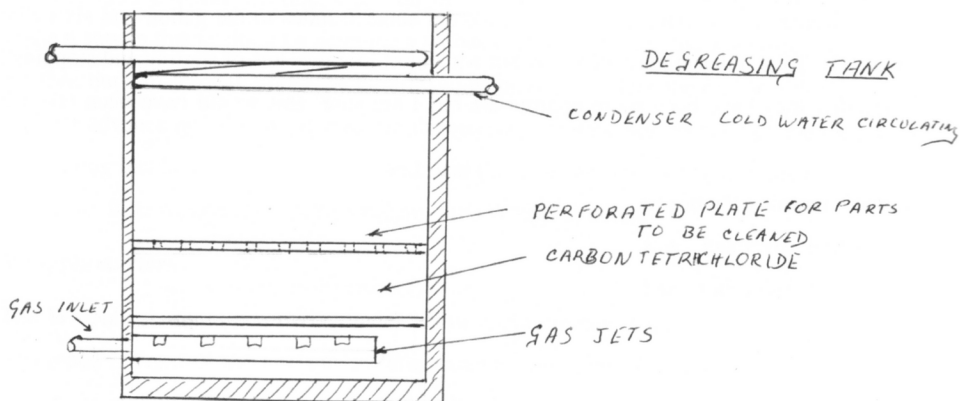


Figure 4: Degreasing Tank

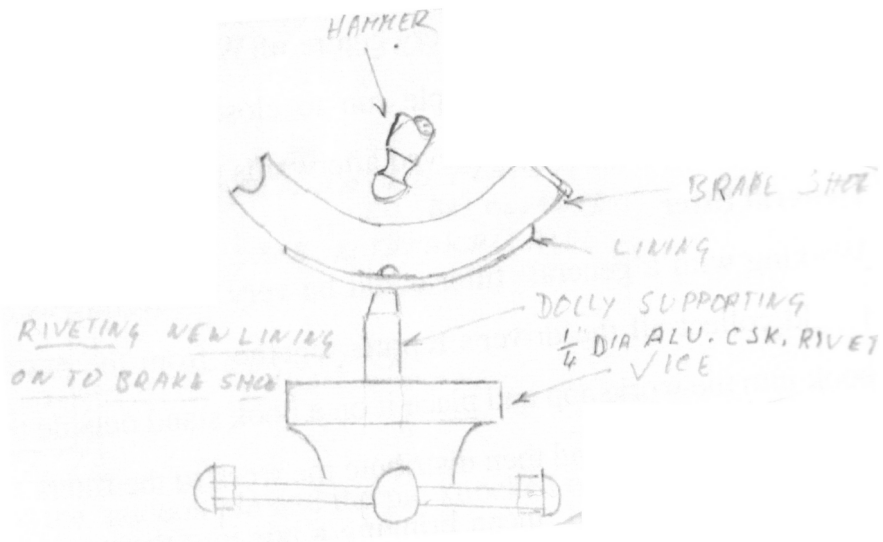


Figure 5: Riveting a new lining on the brake shoe

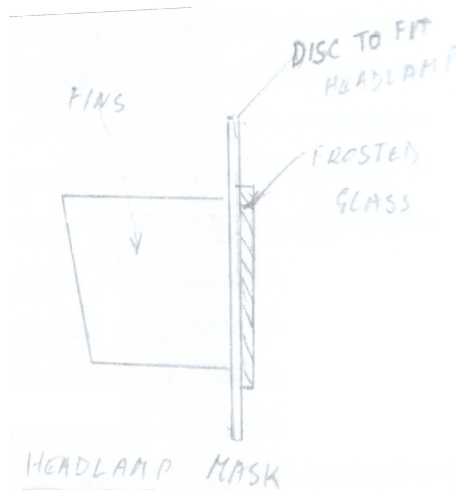


Figure 6: Headlamp mask

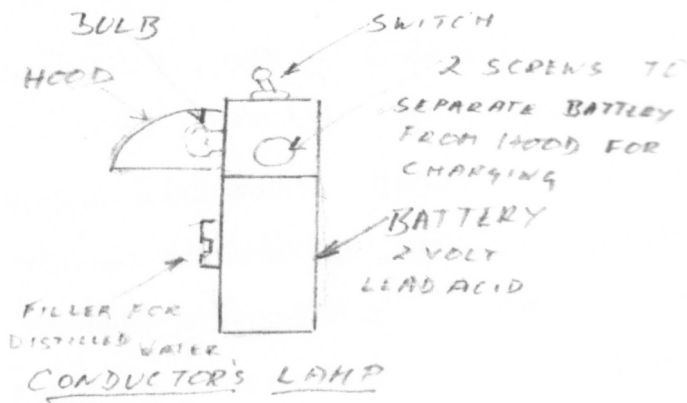


Figure 7: Wartime bus conductor's lamp

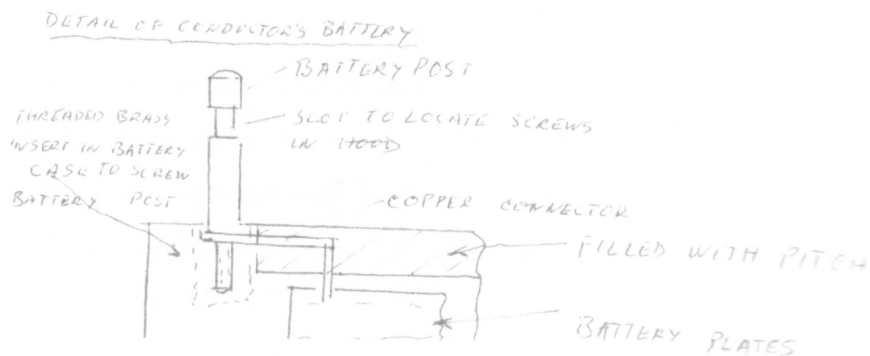


Figure 8: Battery for conductor's lamp

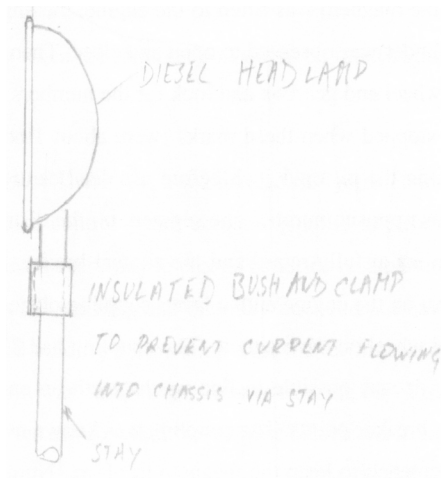


Figure 9: Diesel bus headlamp

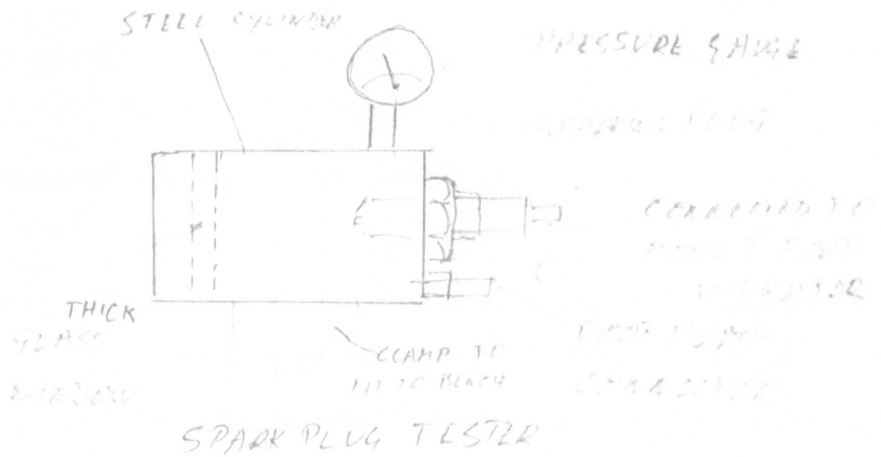


Figure 10: Spark Plug Tester

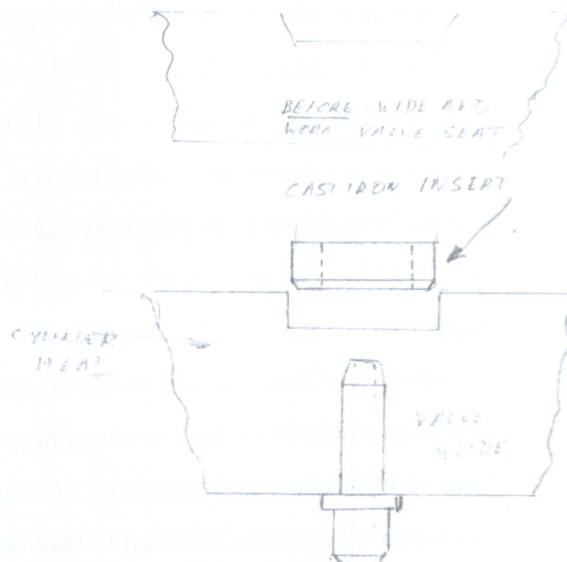


Figure 11: Valve maintenance

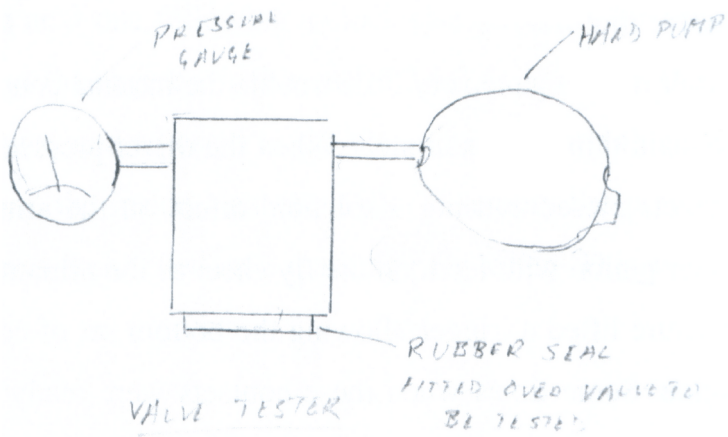


Figure 12: Valve Tester

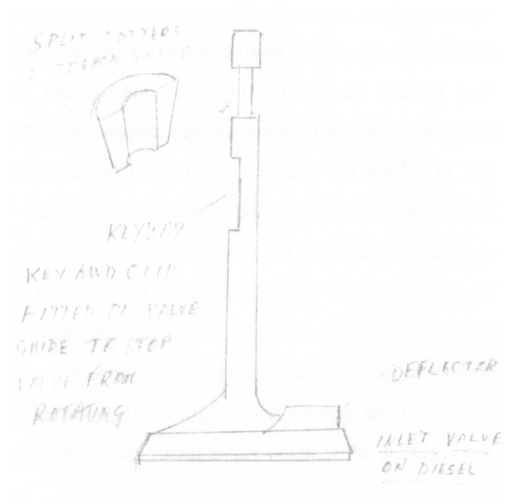


Figure 13: Inlet valve on diesel

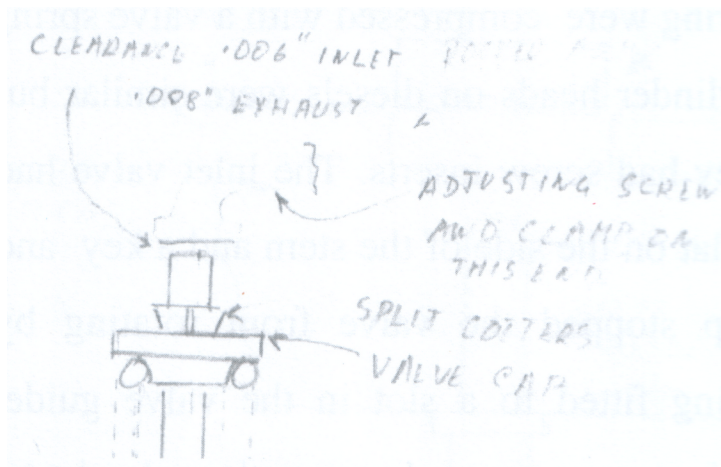


Figure 14: Inlet Valve Clearance Adjustment

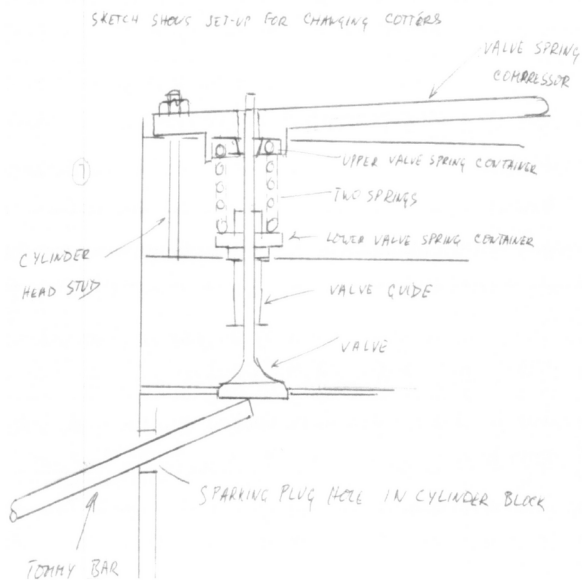
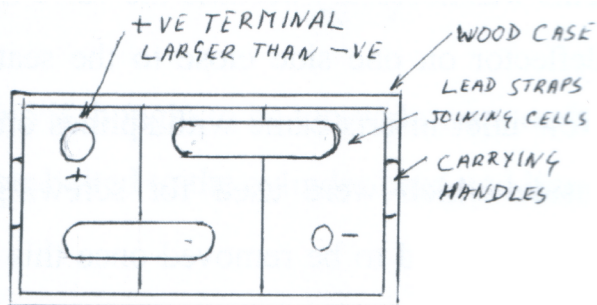


Figure 15: Method for changing cotteners



6 VOLT BATTERY
3 - 2 VOLT CELLS

Figure 16: 6 volt battery

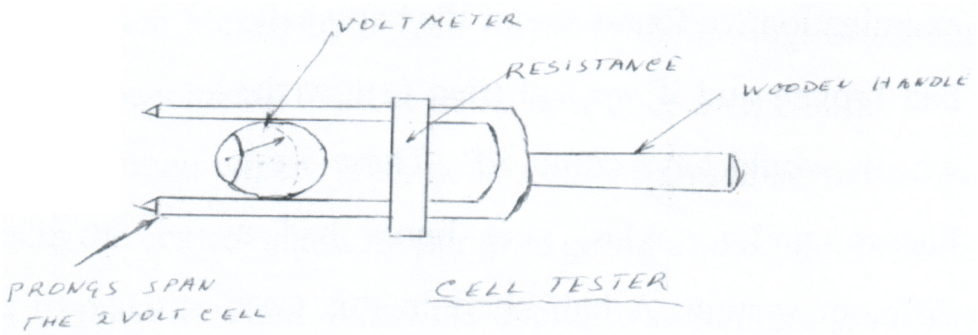


Figure 17: Battery tester

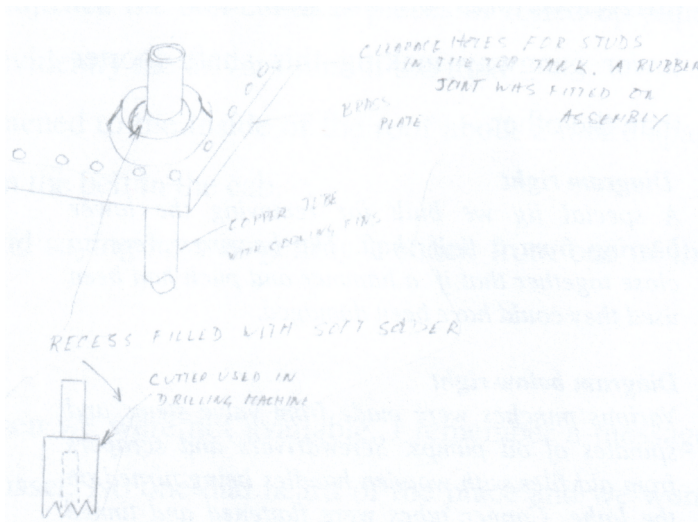
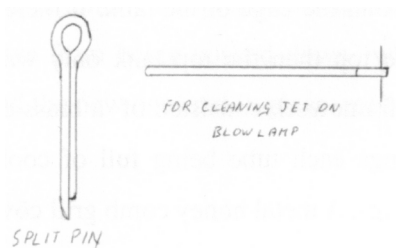
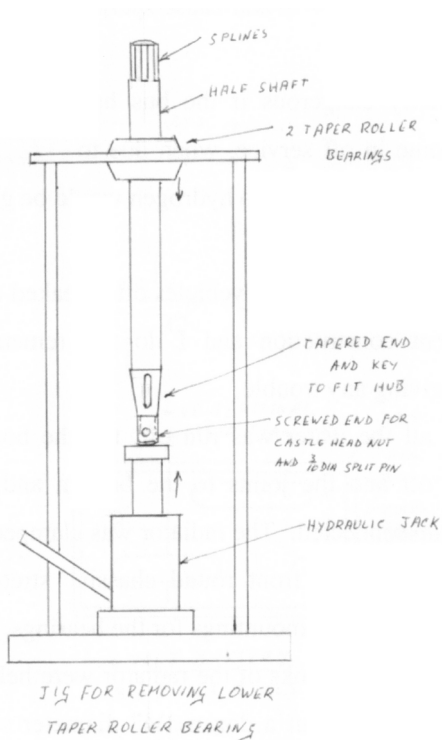


Figure 18: Radiator Maintenance



*Figure 19: Tool for cleaning
blowlamp*



*Figure 20: Jig for removing lower taper
roller bearings*

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Ronald Smith (1920 – 2013) recounts memories of life at the Cumberland Motor Services garage in Workington between 1935 and 1944. Ron started work as an apprentice sweeping the floors and then later became a mechanic, maintaining buses such as the Leyland Lion and Tiger. The tools and techniques of bus repair are discussed, the make do and mend attitude through the war years and the personalities working at the company during this time.